

Methods of construction of exponential bases on planar domains

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The problem of proving (or disproving) the existence of exponential bases on measurable sets of the plane is still largely unsolved. An exponential basis is a set of exponential functions in the form of $\{e^{2\pi i\langle\lambda,\vec{x}\rangle}\}_{\lambda\in\Lambda}$, where Λ is a discrete set of $\mathbb{R}^2$. The main examples of domains where exponential bases exist are shapes that tile the plane by translations, polygons with central symmetry, and unions of rectangles with sides parallel to the axes. We still know nothing about the existence of exponential bases on triangles, irregular polygons, and disks. In my talk, I will introduce an approach for constructing exponential bases on specific types of polygons using approximation by dyadic squares. I will also discuss examples and explore generalizations of the results.

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